

AMENDMENTS TO THE CLAIMS

Claims 1-2. (Canceled)

Claim 3. (Allowed) An organometallic compound having bonds between hafnium atoms and nitrogen atoms, wherein:

the general formula of the compound is represented by the following formula



(wherein R^1 represents a methyl group or ethyl group, R^2 represents an ethyl group, n represents the valence of Hf, and s represents an integer of 0 to n-1); and

the chlorine content in the compound is 200 ppm or less and the water content in the compound content is 30 ppm or less.

Claim 4. (Allowed) An organometallic compound; having bonds between silicon atoms and nitrogen atoms, wherein:

the general formula of the compound is represented by the following formula



(wherein R^1 represents a methyl group or ethyl group, R^2 represents an ethyl group, n represents the valence of Si, and s represents an integer of 0 to n-1); and

the chlorine content in the compound is 1 ppm or less and the water content in the compound is 30 ppm or less.

Claim 5. (Allowed) A synthesis method of an organometallic compound comprising:
obtaining a crude product of an organometallic compound by using a metal-containing compound and aminolithium;
distilling said crude product under reduced pressure in a vacuum distillation step to obtain a purified product of said organometallic compound; and,

removing impurities contained in the purified product in an impurity removal step using flash chromatography following said vacuum distillation step.

Claim 6. (Allowed) A synthesis method according to claim 5, wherein said impurity removal step comprises:

forming a filler layer inside a pressure-resistant column by filling into said column a slurry prepared by adding a filler to a developing solvent;

injecting said purified product into a top of the filler layer; and,

passing said purified product through the filler layer by supplying a pressurized gas at a predetermined flow rate into the column from a top of the column to adsorb impurities contained in said purified product in the filler layer.

Claim 7. (Allowed) A synthesis method according to claim 5, wherein said impurities removed from the purified product are chlorine and water.

Claim 8. (Allowed) A synthesis method according to claim 6, wherein said impurities removed from the purified product are chlorine and water.

Claim 9. (Allowed) A synthesis method according to claim 6, wherein said developing solvent is at least one organic solvent selected from the group consisting of n-alkane, diethyl ether and dichloromethane, and a water content in the organic solvent is 30 ppm or less.

Claim 10. (Allowed) A synthesis method according to claim 6, wherein said filler in the column comprises at least one type of particle selected from the group consisting of SiO₂ particles, Al₂O₃ particles, ZrO₂ particles, TiO₂ particles and HfO₂ particles having a mean particle diameter of 0.3-0.5 m, and a particle size distribution width d₉₀/d₁₀ of 0.8-1.2.

Claim 11. (Allowed) A synthesis method according to claim 6, wherein said pressure-resistant column is a glass column having a diameter of 10-20 cm and a height of 30-50 cm.

Claim 12. (Allowed) A synthesis method according to claim 10, wherein said pressure-resistant glass column is filled with 500-1000 g of column filler.

Claim 13. (Allowed) A synthesis method according to claim 11, wherein said pressure-resistant glass column is filled with 500-1000 g of column filler.

Claim 14. (Allowed) A synthesis method according to claim 6, wherein the pressurized gas is Ar gas, a pressure of the pressurized gas is 1-2 kg, and a column flow rate has a spatial velocity (SV value) of 2-4 cm/min.

Claim 15. (Allowed) A synthesis method according to claim 5, wherein said metal-containing compound is hafnium chloride, zirconium chloride, tantalum chloride, titanium chloride, cerium chloride, vanadium chloride, lanthanum chloride, niobium chloride, nickel chloride or silane tetrachloride.

Claim 16. (Allowed) A synthesis method according to claim 5, wherein said aminolithium is obtained by reacting one of dimethylamine and diethylamine with n-butyllithium.

Claim 17. (Allowed) A synthesis method according to claim 5, wherein when said metal-containing compound is hafnium chloride, the resulting organometallic compound is one of tetraquis(dimethylamino)hafnium and tetraquis(diethylamino)hafnium.

Claim 18. (Allowed) A synthesis method according to claim 15, wherein when said metal-containing compound is hafnium chloride, the resulting organometallic compound is one of tetraquis(dimethylamino)hafnium and tetraquis(diethylamino)hafnium.

Claim 19. (Allowed) A synthesis method according to claim 5, wherein when the metal-containing compound is silane tetrachloride, the resulting organometallic compound is one of tetraquis(dimethylamino)silane and tetraquis(diethylamino)silane.

Claim 20. (Allowed) A synthesis method according to claim 15, wherein when the metal-containing compound is silane tetrachloride, the resulting organometallic compound is one of tetraakis(dimethylamino)silane and tetraakis(diethylamino)silane.

Claims 21-22. (Canceled)

Claim 23. (Allowed) A solution raw material containing an organometallic compound according to claim 3 dissolved in an organic solvent.

Claim 24. (Allowed) A solution raw material comprising an organometallic compound according to claim 4 dissolved in an organic solvent.

Claim 25. (Currently Amended) A solution raw material comprising an organometallic compound obtained by a synthesis method according to claim 5 dissolved in an organic solvent; wherein a metal atom of the organometallic compound is at least one of Hf, Ta, Ce, Al, V, La, Nb, or Ni.

Claim 26. (Currently Amended) A solution raw material comprising an organometallic compound obtained by a synthesis method according to claim 6 dissolved in an organic solvent; wherein a metal atom of the organometallic compound is at least one of Hf, Ta, Ce, Al, V, La, Nb, or Ni.

Claims 27-28. (Canceled)

Claim 29. (Allowed) A solution raw material according to claim 23, wherein said organic solvent is at least one type of compound selected from the group consisting of n-alkane, tetrahydrofuran, cyclohexane, cycloalkane and branched alkane.

Claim 30. (Allowed) A solution raw material according to claim 24, wherein said organic solvent is at least one type of compound selected from the group consisting of n-alkane, tetrahydrofuran, cyclohexane, cycloalkane and branched alkane.

Claim 31. (Original) A solution raw material according to claim 25, wherein said organic solvent is at least one type of compound selected from the group consisting of n-alkane, tetrahydrofuran, cyclohexane, cycloalkane and branched alkane.

Claim 32. (Original) A solution raw material according to claim 26, wherein said organic solvent is at least one type of compound selected from the group consisting of n-alkane, tetrahydrofuran, cyclohexane, cycloalkane and branched alkane.

Claims 33-34. (Canceled)

Claim 35. (Allowed) A metal-containing thin film produced by metal organic chemical vapor deposition using an organometallic compound according to claim 3.

Claim 36. (Currently Amended) A metal-containing thin film produced by metal organic chemical vapor deposition using an organometallic compound obtained by a synthesis method according to claim 5;

wherein a metal atom of the organometallic compound is at least one of Hf, Ta, Ce, Al, V, La, Nb, or Ni.

Claim 37. (Currently Amended) A metal-containing thin film produced by metal organic chemical vapor deposition using an organometallic compound obtained by a synthesis method according to claim 6;

wherein a metal atom of the organometallic compound is at least one of Hf, Ta, Ce, Al, V, La, Nb, or Ni.

Claims 38-39. (Canceled)

Claim 40. (Allowed) A metal-containing thin film produced by metal organic chemical vapor deposition using a solution raw material according to claim 23.

Claim 41. (Allowed) A metal-containing thin film produced by metal organic chemical vapor deposition using a solution raw material according to claim 24.

Claim 42. (Original) A metal-containing thin film produced by metal organic chemical vapor deposition using a solution raw material according to claim 25.

Claim 43. (Original) A metal-containing thin film produced by metal organic chemical vapor deposition using a solution raw material according to claim 26.